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Calafut et al.(10) **Pub. No.: US 2014/0073098 A1**(43) **Pub. Date: Mar. 13, 2014**(54) **METHOD FOR FORMING A SCHOTTKY
BARRIER DIODE INTEGRATED WITH A
TRENCH MOSFET****Publication Classification**(51) **Int. Cl.**
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Incorporated**, Sunnyvale, CA (US)(21) Appl. No.: **14/083,309**(22) Filed: **Nov. 18, 2013****Related U.S. Application Data**(63) Continuation of application No. 13/241,126, filed on
Sep. 22, 2011, now Pat. No. 8,610,235.(57) **ABSTRACT**

A method for forming a Schottky diode including forming first and second trenches in a semiconductor layer, forming a thin dielectric layer lining sidewalls of the first and second trenches; forming a trench conductor layer in the first and second trenches where the trench conductor layer fills a portion of each of the first and second trenches and being the only one trench conductor layer in the first and second trenches; forming a first dielectric layer in the first and second trenches to fill the remaining portions of the first and second trenches; and forming a Schottky metal layer on a top surface of the lightly doped semiconductor layer between the first trench and the second trench to form a Schottky junction. The Schottky diode is formed with the Schottky metal layer as the anode and the lightly doped semiconductor layer between the first and second trenches as the cathode.

